PITAGORAS ACADEMIA

EJERCICIOS CLASE - ÁLGEBRA

CAPÍTULO: LOGARITMOS EN REALES
TEMA: FUNCION EXPONENCIAL - LOGARITMICA
PRODUCTO: UNI AVANZADA
PROFESOR: FREDDY AVALOS CUARITE

1. Indique el número de soluciones de

$\log_{\sqrt{x-7}} \sqrt{x^2+x} = 2$

A) 1 B) 2 C) 0
D) 3 E) 4

2. Halle $\frac{m}{n}$ si

$\log_3 n = \log_6 m = \log_{12}(m+n)$

A) $\frac{1-\sqrt{5}}{2}$ B) $\frac{1+\sqrt{5}}{2}$ C) $\sqrt{5}$
D) $1-\sqrt{5}$ E) $1+\sqrt{5}$

3. Sea *f* una función cuya regla de correspondencia está dado por

$f_{(x)} = \log_a\left(x+\sqrt{x^2+1}\right)$

Encuentre su función inversa.

A) $a^x + a^{-x}$ B) $\frac{a^x+a^{-x}}{2}$ C) $a^x - a^{-x}$
D) $\frac{a^x-a^{-x}}{2}$ E) $\frac{a^x}{2}$

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4. Resuelva la inecuación logarítmica

$\log_{1-n}\left(\frac{x}{|x|+1}\right) \le \log_{1-n}\left(\frac{2}{x}\right);\ n \in \langle 0;1\rangle$

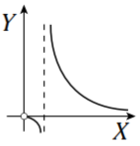
A) $\left[1+\sqrt{3};\ +\infty\right\rangle$
B) $\langle 1;\ +\infty\rangle$
C) $\left\langle\sqrt{2};+\infty\right\rangle$
D) $\left[1+\sqrt{2};5\sqrt{2}\right\rangle$
E) $\left[1+\sqrt{2};+\infty\right\rangle$

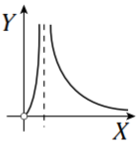
5. Calcule el rango de la función

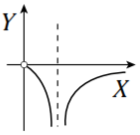
$P_{(x)} = 2^{\sqrt{3}\cos x + \operatorname{sen} x};\ \forall\, x \in \mathbb{R}$

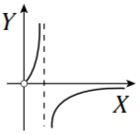
A) $\left[\frac{1}{2};8\right]$ B) $\left[\frac{1}{2};8\right\rangle$ C) $\left[\frac{1}{8};8\right\rangle$
D) $\left[\frac{1}{4};4\right]$ E) $\left\langle\frac{1}{2};2\right\rangle$

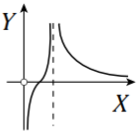
6. Grafique $f:\mathbb{R}^+ - \{1\} \to \mathbb{R} / f_{(x)} = \log_x 3$

A) 

B) 

C) 

D) 

E) 

7. Determine un intervalo solución

$\frac{9^x - 4\cdot 3^x - 5}{x^2 - x - 6} \le 0$

A) $\langle -\infty; -1\rangle - \{-2\}$
B) $\langle 3;\ +\infty\rangle$
C) $\left\langle -2; \log_3 5\right]$
D) $\left[\log_3 5; +\infty\right\rangle - \{3\}$
E) $\left[\log_3 5; 3\right\rangle$

8. Encuentre el dominio de la función

$f_{(x)} = \sqrt{\log_{\frac{1}{2}}\left[\ln(9-x^2)\right]}$

A) $\langle -3;\ 3\rangle$
B) $\left\langle -2\sqrt{2}; -\sqrt{9-e}\right] \cup \left[\sqrt{9-e}; 2\sqrt{2}\right\rangle$
C) $\left\langle -2\sqrt{2}; 2\sqrt{2}\right\rangle$
D) $\left\langle -2\sqrt{2}; -\sqrt{9-e}\right\rangle \cup \left\langle\sqrt{9-e}; 2\sqrt{2}\right\rangle$
E) $\left\langle\sqrt{9-e}; 3\right\rangle$

9. Si $\log_3^2 5 + 1 = x\log_3 5$,

calcule $A = \frac{x^3 - 3x}{\log_3^3 5 + \log_5^3 3}$.

A) 0 B) 1 C) 2
D) 3 E) 4

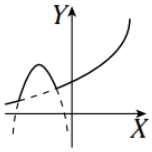
10. Calcule la suma de las soluciones que presenta la ecuación $x^{5\log e+\log x}=e^{-6\log e}$

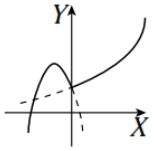
A) $e^{-3}(1+e)$
B) 6
C) $\log_e^{-3}(1+\log e)$
D) $\log_6 e$
E) $e^{-2}(1+e^2)$

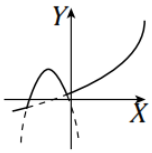
11. Al resolver la inecuación
$(\log_2 x-\log_3 x)(x-2)<0$
se obtiene como conjunto solución a $\langle \ln a;\ln b\rangle$.
Calcule ab.

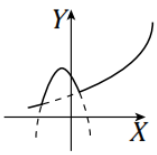
A) e^4 B) e^{-1} C) e^3
D) e^2 E) e^{-2}

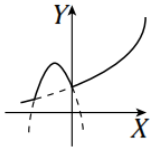
12. Esboce la gráfica de la función
$f_{(x)}=\max\{\pi^x;5-(x+2)^2\}$

A) 

B) 

C) 

D) 

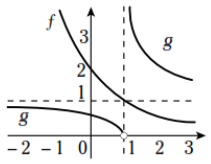
E) 

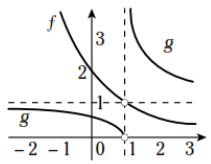
13. Calcule la función inversa de
$f_{(x)}=4^x+2^{x+1}$

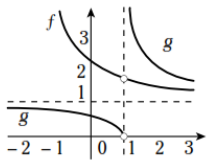
A) $f^*_{(x)}=\log_2(\sqrt{x-1}+1);\ x>1$
B) $f^*_{(x)}=\log_2(\sqrt{x+1}+1);\ x>0$
C) $f^*_{(x)}=\log_2(\sqrt{x-1}-1);\ x>1$
D) $f^*_{(x)}=\log_2(\sqrt{x-1}-1);\ x>1$
E) $f^*_{(x)}=\log_2(\sqrt{x+1}-1);\ x>0$

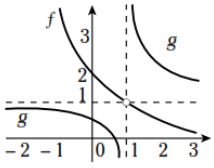
14. Diga cuál de las siguientes gráficas representa aproximadamente a las funciones
$f;g:\mathbb{R}-\{1\}\to\mathbb{R}$ definidas por

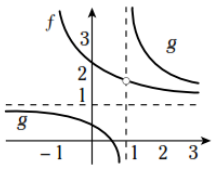
$f_{(x)}=2^{-x+1}$ y $g_{(x)}=2^{\frac{1}{x-1}}$

A) 

B) 

C) 

D) 

E) 

15. Resuelva la inecuación

$$\left[3^{-x}-\log_3(-x)\right]\left(2^x-2x-1/3\right)>0$$

A) $\langle-\infty;0\rangle$
B) $\langle-\infty;-1\rangle$
C) $\mathbb{R}$
D) $\mathbb{R}_0^-$
E) $\langle-\infty;-2\rangle$

1. Halle el rango de f si
$f_{(x)}=2^{2x+1}+4^{x-1};\ x\in[1;2\rangle$

A) $[9;+\infty\rangle$ B) $\langle 8;36\rangle$ C) $\langle 8;32]$
D) $[9;36\rangle$ E) $[7;35\rangle$

2. Resuelva la siguiente inecuación:
$$\left(\frac{\pi}{e}\right)^{\left(\frac{e}{\pi}\right)^{|x-1|}}\leq\left(\frac{\pi}{e}\right)^{\left(\frac{\pi}{e}\right)^{x-2}}$$

A) $\left[\frac{3}{2};+\infty\right\rangle$ B) $[1;+\infty\rangle$ C) $\left\langle-\infty;\frac{2}{3}\right]$
D) $[-\infty;-1]$ E) $\frac{3}{2}$

3. Resuelva la siguiente inecuación:
$(3^{|x-3|}-3^2)\left(\log_{\frac{3}{5}}x-1\right)\geq 0$

A) $\left\langle 0;\frac{3}{5}\right]\cup[1;5\rangle$
B) $\left[1;\frac{13}{5}\right]\cup\langle 4;+\infty\rangle$
C) $\left[1;\frac{13}{5}\right]\cup[5;+\infty\rangle$
D) $\left\langle 0;\frac{1}{5}\right]\cup[4;+\infty\rangle$
E) $\left\langle 0;\frac{2}{5}\right]\cup[4;+\infty\rangle$

4. Calcule el valor de $\sqrt{n}+n$ si se cumple que
$(0,1)^{(0,1)}\cdot(0,2)^{(0,2)}=(0,004)^{n(0,004)}$

A) 25 B) 30 C) 5
D) 2 E) 12

5. Luego de resolver la ecuación $9^x+2\cdot 3^{-1}=7\cdot 3^{x-1}$ se obtiene una solución racional α y la otra irracional β. Calcule el valor de $\alpha+\beta\cdot\log_2 3$.

A) 1 B) -3 C) 0
D) -2 E) -1

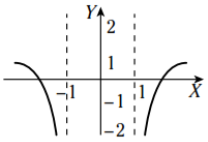
6. Determine el producto de las soluciones de la ecuación $3^{\log_3^2 x}+x^{\log_3 x}=162$

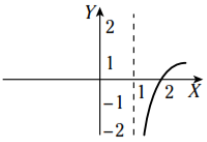
A) 1/4 B) 1 C) 3
D) 9 E) 81

7. Determine la inversa de la función
$f_{(x)}=\frac{3^x-1}{3^x+2};\ x\in\mathbb{R}$

A) $f^*_{(x)}=\log_3\left(\frac{1-x}{1+2x}\right);\ x\in\left\langle-\frac{1}{2};1\right\rangle$
B) $f^*_{(x)}=\log_3\left(\frac{1+2x}{1-x}\right);\ x\in\left\langle-\frac{1}{2};1\right\rangle$
C) $f^*_{(x)}=\log_3\left(\frac{2x-1}{1-x}\right);\ x\in\left\langle\frac{1}{2};1\right\rangle$
D) $f^*_{(x)}=\log_3\left(\frac{1+x}{1-x}\right);\ x\in\langle-1;1\rangle$
E) $f^*_{(x)}=\log_3\left(\frac{1-x}{2x-1}\right);\ x\in\left\langle\frac{1}{2};1\right\rangle$

8. Señale cuál de las figuras representa adecuadamente la gráfica de la función
$f_{(x)}=\log(|x|+1)+\log(|x|-1)$

A)


B)


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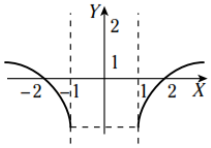

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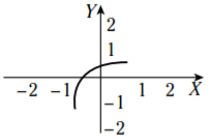

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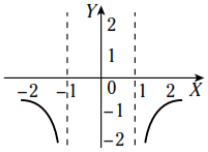
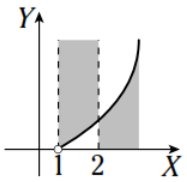
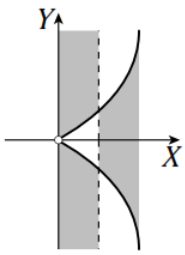
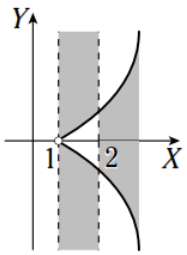
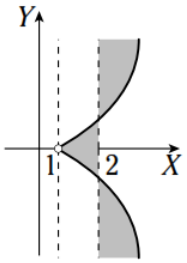


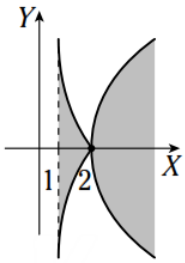
9. Esboce la gráfica de la siguiente relación
$R = \{(x; y) \in \mathbb{R}^2 / \log_{x-1}|y| \leq 2\}$

A) 

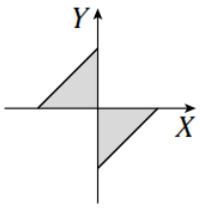
B) 

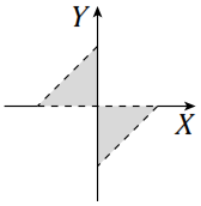
C) 

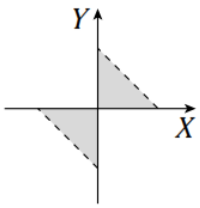
D) 

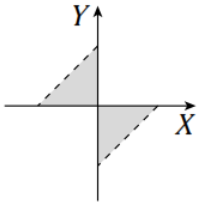
E) 

10. Grafique el conjunto solución de
$\log_{1/5}(1-|-x-y|) \leq \log_{1/5}(1-|x-y|)$

A) 

B) 

C) 

D) 

E)